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1 CLAIMS:

2 1. A biocide concentrate composition comprising I⁻ and
3 propionic acid.

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5 2. A biocide concentrate composition, comprising: I⁻ and
6 propionic acid for pH control, and for combining with ambient NH₃
7 to form ammonium propionate, thereby producing residual biocidal
8 activity, and inhibiting or preventing microorganism formation,
9 including mold formation.

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11 3. A biocide concentrate composition for use in hard water,
12 and in the presence of organic material, comprising: HI or I⁻, and
13 propionic acid for pH control, and for combining with ambient NH₃,
14 to form ammonium propionate, thereby producing residual biocidal
15 activity, and inhibiting or preventing microorganism formation,
16 including mold formation.

17 4. A biocide concentrate composition for use in hard water,
18 and in the presence of organic material, comprising:

19 a.) a surfactant agent and the like, for complexing or
20 stabilizing iodine;

21 b.) a biocidal amount of iodine complexed by the surfactant
22 agent, or by hydroiodic acid, and surfactant;

23 c.) propionic acid, and the like for pH control, and for
24 combining with ambient NH₃ to form ammonium propionate, thereby
25 producing residual biocidal activity, and inhibiting
26 microorganism formation, including preventing mold formation;

27 and,

28 d.) acidifiers to adjust the composition pH to within the acid
29 range.

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32 5. The composition of Claim 4, adapted for use on animal
33 husbandry surfaces, ~~with~~ ^{when the water is} hard water up to about 1,000 ppm.

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112 6. The composition of Claim 4, ^{wherein} ~~including~~ ^{ante} propylene glycol, ^{is present} and the like for inhibiting dust formation.

7. A biocide concentrate composition, comprising:
a.) a surfactant agent and the like, for complexing or stabilizing iodine and hydriodic acid;
b.) a biocidal amount of iodine complexed by the surfactant and hydriodic acid, and for reducing surface tension;
c.) propionic acid, and the like for pH control, and for imparting biocidal activity; and,
d.) acidifiers to adjust the composition pH to within the acid range.

8. The composition of Claim 7, ^{wherein} ~~including~~ ^{is present} propylene glycol, ~~and the like~~ for solubilizing components of the composition to inhibit dust formation and, providing product stability and increasing penetrability into microorganisms and surfaces.

9. The composition of Claim 4, in which the surfactant ^{is} ~~comprises~~ a polyoxyethylene polyoxypropylene block copolymer.

10. The composition of Claim 4, in which the surfactant is ^{group} selected from the class consisting of non-ionic; laureth (11 - 16) carboxylic acid; PVP; nonyl phenoxy polyethoxy ethanol; polyethenoxy; and, polyethoxylated polyoxypropylene block copolymer.

11. The composition of Claim 4, which comprises,
iodine: at least about 0.1%; hydriodic acid: at least about 0.01%; propionic acid, and the like: at least about 10%; phosphoric acid and/or sulfuric acid, and the like: sufficient to obtain a pH of about -2 to 3; a buffer: at least about 1%; and, propylene glycol, and the like: at least about 5%, all parts by weight.

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1 12. The composition of Claim 10, which comprises,
2 iodine: about 0.1% - 5%, hydriodic acid: about 0.01% - 2%;
3 propionic acid, and the like: about 10% - 75%; an acid sufficient
4 to obtain a pH of about -2 to 3; a buffer: at least about 1%;
5 and, propylene glycol, and the like: about 5% - 30%, all parts by
6 weight.

7
8 13. The composition of Claim 11, in which the acidifying agent
9 and buffer is an acid selected from the class consisting of
10 citric acid, lactic acid, sorbic acid, maleic acid, fumaric acid
11 ~~and the like~~, and their salts and esters, and mixtures thereof.

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13 14. The composition of Claim 11, ^{wherein water is present as} comprising a ~~water~~ diluent.

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15 15. The composition of Claim 13, ^{about} comprising a ~~water~~ diluent of
16 ~~about 20% - 40%~~ by weight of the composition.

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18 16. The composition of Claim 4, which commences biocidal
19 activity within about ten minutes, provides biocidal activity for
20 about ten minutes to about five hours, and maintains activity in
21 the presence of organic matter.

22
23 17. The composition of Claim 4, in which activity of the
24 composition is maintained in the presence of ~~up to about 50%~~ of
25 ~~organic matter~~, and 1,000 ppm. of hard water.

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27 18. The composition of Claim 15, ⁴ in which the composition has
28 a shelf life of up to about one year to eighteen months, at
29 ambient temperatures.

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32 19. A method for inhibiting or preventing biocidal activity by
33 applying a composition comprising ~~I~~ and propionic acid. ^{as Claim 4 +}

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1 20. A method for inhibiting or preventing biocidal activity in
2 the presence of organic material, which comprises applying HI or
3 I and propionic acid for pH control, and for combining with
4 ambient NH_3 to form ammonium propionate, thereby producing
5 residual biocidal activity and inhibiting or preventing
6 microorganism formation, including mold formation.

7 21. A method for reducing or eliminating biocides from
8 surfaces for animal husbandry, animal feed and food processing
9 operations in the presence of hard water, comprising, applying to
10 the surface a solution containing a surfactant agent, and the
11 like; a biocidal amount of hydriodic acid and complexed or
12 stabilized iodine; propionic acid, and the like for pH control,
13 and for combining with ambient NH_3 to form ammonium propionate,
14 thereby producing residual biocidal activity, and inhibiting or
15 preventing microorganism, including mold formation; and,
16 acidifiers to adjust the composition pH to within the acid range.
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19 22. The method of Claim 21, in which biocidal activity is
20 commenced within about ten minutes, remains active for about ten
21 minutes to about five hours, and biocidal activity is maintained
22 in the presence of organic matter.

23 23. The method of Claim 21, including propylene glycol, and
24 the like for inhibiting dust formation.
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27 24. The method of Claim 21, including propylene glycol, and
28 ~~the like for dissolving components of the composition, and for~~
29 inhibiting dust formation.
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31 25. The method of Claim 21, in which the surfactant comprises
32 a polyoxyethylene polyoxypropylene block copolymer with an HLB of
33 about 1.0 - 7.0.
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1 26. The method of Claim 21, in which the surfactant is
2 selected from the ^{group} ~~class~~ consisting of polyethenoxy; non-ionic,
3 laureth (11 - 16) carboxylic acid; PVP; nonyl phenoxypolyethoxy
4 ethanol; and, polyethoxylated polyoxypropylene block copolymer.

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6 27. The method of Claim 21, which comprises applying the
7 solution to the animal husbandry surface in the presence of hard
8 water up to about 1,000 ppm.

9
10 28. The method of Claim 21, in which the solution comprises:
11 iodine: about at least 0.1%; hydriodic acid: at least about
12 0.01%; propionic acid, and the like: at least about 10%;
13 phosphoric acid and/or sulfuric acid, and the like: sufficient to
14 obtain a pH of about -2 to 3; an acidifying agent and buffer:
15 about 0% - 10%; and, propylene glycol, and the like: about
16 0% - 10%, all parts by weight.

17
18 29. The method of Claim 28, in which the solution comprises:
19 iodine: up to about 5%; hydriodic acid: about
20 0.01% - 2%; propionic acid, and the like: about 10% - 75%;
21 phosphoric acid and/or sulfuric acid, and the like: sufficient to
22 obtain a pH of about -2 to 3; a buffer: about 0% - 10%; and,
23 propylene glycol, and the like: about 5% - 30%, all parts by
24 weight.

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26 30. The method of Claim 28, in which the acidifying agent and
27 buffer is an acid selected from the class consisting of citric
28 acid, lactic acid, maleic acid, fumaric acid, sorbic acid and the
29 ~~like~~, their salts and mixtures thereof.

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31 31. The method of Claim 28, in which the ^{as a} ~~composition includes~~
32 a water diluent.

*Dependent
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1 32. The method of Claim 31, in which the water diluent
2 comprises about 20% - 40% by weight of the composition.

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4 33. The method of Claim 22, in which biocidal activity
5 commences within about ten minutes, provides biocidal activity
6 for about ten minutes to about five hours, and maintains activity
7 in the presence of organic matter.

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9 34. The method of Claim 20, in which the ~~composition~~ ^{*soln*} has a
10 shelf life of at least one year at ambient temperatures.

11
12 35. The method of Claim 21, in which activity of the
13 ~~composition~~ ^{*soln*} is maintained in the presence of up to about 50% of
14 organic matter.

15
16 36. A method for reducing or removing microorganisms from
17 surfaces, comprising applying to the surface a solution
18 containing a surface agent for complexing iodine and hydriodic
19 acid and for reducing surface tension; a biocidal amount of
20 complexed iodine and HI; and, propionic acid and the like for pH
21 control, and for imparting biocidal activity; and, acidifiers to
22 adjust the composition pH to within the acid range.

23
24 37. A method for inhibiting or preventing microorganism
25 formation, in the presence of organic material in an animal
26 husbandry environment, which comprises applying propionic acid
27 for pH control, and for combining with ambient NH₃ to form
28 ammonium propionate, thereby producing residual biocidal activity
29 and inhibiting or preventing microorganism formation, including
30 mold formation.

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1 38. A bovine teat dip composition, according to Claim 1.

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3 39. A bovine teat dip composition, according to Claim 2.

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5 40. The method of Claim 19, for use as a bovine teat dip.

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7 41. The method of Claim 20, for use as a bovine teat dip.

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